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Predicting Public Support for Carbon Capture and Storage Policy

TEXAS Geosciences
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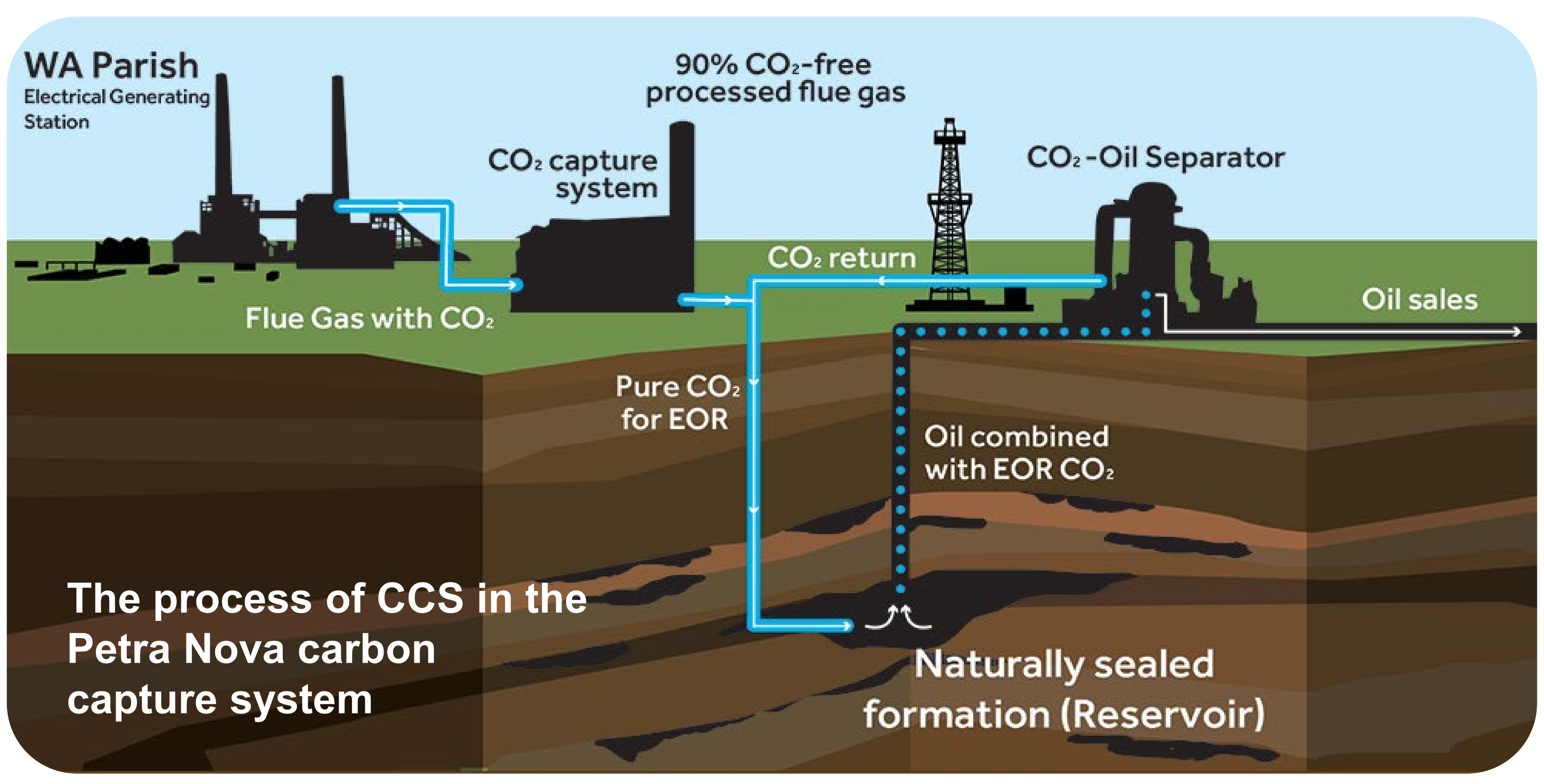
Problem

The state of Texas is one of the U.S.'s biggest emitters of carbon dioxide (EIA, 2019), thus the development of carbon capture and storage (CCS) technologies has increased in recent years in the state. As nascent technological solutions to mitigate climate change emerge, **there also is an increased need to understand what variables lead to public support for the technology and for the public policies that will shape or thwart its evolution.** Researchers studying carbon capture know that the sustainability of the research is dependent on public support. Wide adoption of and support for the technology will mean that society will need to "treat carbon dioxide like sewage, requiring consumers or companies to pay for its collection and disposal, whether in taxes or fees" (Temple, 2019). **This necessitates a paradigm shift in public opinion.**



Goals of the Study

The present study focused on CCS as a context for exploring what shapes **public support of emerging climate change mitigation technology**. We analyzed the **roles of 1) technology perceptions**: perceived risk/benefit, knowledge, and emotions about the risk/benefit of the technology, **2) social perceptions:** perceptions of stakeholders and social capital (including individuals' perceptions of social networks and trust) **in support for CCS policy at both the individual and community levels** (i.e., I think my community will support CCS policy).

Status

How the public perceives those attendant risks and benefits can be shaped by myriad stakeholders (and **trust in those stakeholders**), and can manifest at the individual and community level. Public relations efforts related to policies regarding emerging technologies such as **CCS need to be responsive to a complex array of factors that drive public support**. The context for this study was further focused on **communities in which CCS technology is being explored and will (with support) be implemented as a viable climate change mitigation option.**

Survey

1. Location: **Southeast region of Texas** where CCS technology is currently being developed (Eight Texas counties: Brazoria, Chambers, Liberty, Galveston, Jefferson, Orange, Fort Bend and Harris), **N=949**
2. Ages: From 19 to 53 (M=22.4, SD = 3.18)
3. Race: White or Caucasian 61.9%, Hispanic or Latino 16.3%, Black 15.3%, and Others 6.5%
4. Education status: High school diploma 17.8%, Some college degrees 38.5%, Bachelor's degree 25.9%, A graduate degree 14.8%
5. Median annual household income was $60,000–$75,000, and 19.4% of participants had annual incomes lower than $25,000

Results

Table. OLS Regression Predicting CCS Policy Support

	Individual-level Support		Community-level Support	
	β	t	β	t
Gender	.03	1.23	-.01	-0.26
Age	-.01	-0.48	-.05	-1.59
Education	-.08	-3.37***	-.03	-0.87
Household income	-.01	-0.37	-.06	-2.00*
Trust in stakeholders (a)	.01	0.34	.09	2.90**
Influence of stakeholders (b)	.19	7.08***	.08	2.32*
Perceived benefit of CCS (c)	.20	5.92***	.02	0.43
Perceived risk on CCS (d)	-.01	-0.41	.03	0.82
Positive emotion (e)	.30	10.13***	.14	3.50***
Negative emotion (f)	-.09	-3.58***	.02	0.56
Perceived knowledge (G)	.02	0.64	-.04	-1.05
Climate change awareness (h)	.30	10.79***	.10	2.62**
Social capital (i)	.00	-0.12	.31	10.74***
(a) x (i)	-.03	-1.12	-.09	-2.63**
(b) x (i)	.03	1.15	.11	2.89**
(c) x (i)	-.01	-0.32	.21	0.40
(d) x (i)	.05	1.39	.00	-0.04
(e) x (i)	-.01	-0.34	.04	0.80
(f) x (i)	-.03	-1.01	-.06	-1.55
(g) x (i)	-.01	-0.20	.12	3.02**
(h) x (i)	.01	0.23	.06	1.42
	Adj. R^2 = 0.62		Adj. R^2 = 0.30	
	ΔR^2 = 0		ΔR^2 = 0.05***	
	F (21, 927) = 73.67***		F (21, 927) = 20.58***	

* = p < .05, ** = p < .01, *** p < .001, R^2 change (ΔR^2), Total explained variance (Adj. R^2)

1. Social capital significantly predicts perceived community-level CCS policy support. This result means that people **who have better social trust in or relationship with their community tend to think their community should (or does) support CCS policy.**
2. Social capital also moderates the relationship between some variables and perceived community-level CCS policy support. It means that **psychological attachment to or positive perception of society is significant in environmental policy support.**
3. Thus, **policymakers need to examine the public's social capital** when they build public relations campaigns for environmental energy policy.
4. Individual-level and perceived community-level policy support are somewhat distinct and should be treated as such in investigations of energy policy support.
5. Our work suggests that efforts to build support for **climate mitigation technologies**, such as CCS, must include **a well-balanced portrayal of the risks and benefits of the technology**, and address both individual- and community-level perceptions about what the technology brings to a given community.

Next Steps

1. Future research can consider **hierarchical relationship** between independent variables (e.g., age and risk perception of CCS) by conducting the analysis with structure equation modeling.
2. Modeling the relationship between the independent variables in this study can reveal more insights into the role of the public's perception of societal-level variables on policy making.
3. Different from current study, future work needs to add **actual community support** for the technology to the research mix.

Acknowledgments

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